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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO:
10/024,643	12/21/2001	Yoshiharu Aruga	Q67848	2776

7590 11/12/2002

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213

EXAMINER

MOUTTET, BLAISE L

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 11/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/024,643

Applicant(s)

ARUGA ET AL.

Examiner

Blaise L Mouttet

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-10 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on March 5, 2002. These drawings are approved.

Specification

2. The disclosure is objected to because of the following informalities:
On page 36, line 5 "display unit 13" should read --display unit 113-- in accordance with figure 7.
On page 40, line 19 "son" should read --so--.
Appropriate correction is required.

Claim Objections

3. Claims 1-10 are objected to because of the following minor informalities in syntax:
In claim 1, line 7 "including," should read --including: --
In claim 1, lines 5-7 the overuse of commas results in a poor format of the claimed limitation. The examiner suggests amending this portion of the claim to read --a sub-tank for supplying ink to the recording head from an ink cartridge, wherein the sub-tank is mounted on the carriage with the recording head, the sub-tank including: -- which is clearly applicant's intended meaning given the specification (see figure 1 where 7a-7d are sub tanks mounted on carriage 1 and 9a-9d are ink cartridges).

In claim 4, line 3 "The" should read --the--.

In claim 5, line 7 "the ink supply valve" should read --an ink supply valve-- since this is a new limitation.

In claim 6, line 9 "afloat" should read --float --.

In claim 8, lines 13-14 "referring the count value acquired by the ink consumption counter and determined whether the referred value..." should read --referring to the count value acquired by the ink consumption counter and determining whether the referred value..."

In claim 9, line 4 "the ink supply halt operation" should read --an ink supply halt operation-- since this is a new limitation.

In claim 10, lines 2-3 "when the ink supply halt operation." should read --when the ink supply halt operation in performed. --

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3, 4 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duffield et al. US 4,432,005 in view of Sato US 5,712,667.

Duffield et al. discloses, regarding claim 1, an ink jet recording apparatus comprising:

a recording head (4) mounted on a carriage (2), the recording head (4) being reciprocally movable in a width direction of a recording sheet (column 4, lines 55-60); and

a sub-tank (8a) for supplying ink to the recording head (4) from an ink cartridge (column 4, lines 60-64), wherein the sub-tank (8a) is mounted on the carriage (2) with the recording head (4) (figure 1), the sub-tank including:

an ink level detector (24a), for detecting at least a low ink state in which a quantity of ink stored in the sub-tank (8a) is smaller than a predetermined value, and a full ink state in which the quantity of ink stored in the sub-tank reaches the predetermined value (column 5, lines 17-25),

wherein, when the ink level detector (24a) detects the low ink state, ink is supplied to the sub-tank (8a) from the ink cartridge (column 5, lines 17-25).

Regarding claim 3, an ink supply valve (26a) is disposed along an ink supply path (12a) extending from the ink cartridge to the sub-tank (8a) and when the ink supply valve (26a) is opened, ink is supplied to the sub-tank (8a) (column 5, lines 17-25).

Regarding claim 4, the ink cartridge stores an ink pack (14a) composed of a flexible material in which ink is enclosed, an outer block member (18) of the ink cartridge is airtight, air compressed by an air compressor (22) is applied to a space defined between the ink pack (14a) and the outer block member (18) and ink from the ink cartridge is supplied to the sub-tank under the compressed air (column 4, lines 60-68).

Duffield et al. discloses, regarding claim 8, an ink supply method comprising the steps of

detecting the quantity of ink stored in the sub-tank (8a) by the ink level detector (24a) (column 5, lines 15-21); and

supplying ink from the ink cartridge to the sub-tank (8a) in accordance with the detected quantity (column 5, lines 21-25).

Regarding claim 9, when the ink level detector (24a) detects a full ink state the ink supply is halted (column 5, lines 21-25).

Duffield et al. fails to disclose, regarding claims 1, 8 and 10, that an ink consumption counter is utilized in addition to the ink level detector to determine the ink level in the ink sub-tank and resetting an ink consumption counter upon the ink supply halt operation.

Sato discloses that utilizing a single ink level detector to detect ink level results in an inaccurate detection of ink level (column 2, lines 49-67) and proposes the use of both an ink level detector (3) and an ink consumption counter (101) to provide a more accurate indication of ink level (column 3, lines 38-44, abstract) and teaches resetting the ink consumption counter when the ink level reaches a predetermined level (column 9, lines 5-9).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize an ink consumption counter together with an ink level detector to determine the ink level and reset the ink consumption counter when the ink level reaches a predetermined level as taught by Sato for the ink sub-tank in the ink refill method and apparatus of Duffield et al.

The motivation for doing so would have been to provide a more accurate determination of ink level as taught by column 3, lines 3-8 of Sato.

5. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duffield et al. US 4,432,005 in view of Sato US 5,712,667, as applied to claim 1, and further in view of Kobayashi et al. EP 841 173.

Duffield et al. in view of Sato fail to disclose, regarding claim 2, that the predetermined count value used to determine maximum ink consumption in the ink sub-tank is obtained by taking into account the amount of ink consumed in a cleaning operation.

Duffield et al. in view of Sato fail to disclose, regarding claim 7, assigning coefficients and performing a multiplication process to determine ink consumption with the ink quantity counter.

Kobayashi et al. discloses that when performing ink consumption calculation using a drop counter the ink consumed during cleaning operations must be taken into account in order to attain a proper ink level value (page 2, line 38 - page 3, line 2, abstract) and providing a coefficient setting device (37) to assign coefficients to properly determine the amount of ink consumed by performing a multiplication process (column 4, lines 48-54).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to set the predetermined count value used to determine maximum ink consumption in the ink sub-tank of Duffield et al. in view of Sato by taking into account the amount of ink consumed in a cleaning operation and assign coefficients and performing a multiplication process to determine ink consumption with the ink quantity counter as taught by Kobayashi et al.

The motivation for doing so would have been to properly determine the amount of ink consumed by properly taking into account all sources of ink usage as suggested by page 3, lines 10-13 of Kobayashi et al.

6. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Duffield et al. US 4,432,005 in view of Sato US 5,712,667, as applied to claim 1, and further in view of Dumery US 4,466,284.

Duffield et al. teaches utilizing an ink level sensor (24a) but does not teach any criticality to the type of ink level sensor (see column 5, lines 17-26).

Sato teaches that various types of ink level detectors may be used including optical type ink level sensor (reference numeral 3 in figure 1) or electrode type ink level sensors (reference numeral 3 in figure 6).

Duffield et al. in view of Sato fail to disclose an ink level detector utilizing a float member, a permanent magnet attached to the float and a magnetoelectric element for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member.

Dumery discloses a liquid level detector utilizing a float member (57), a permanent magnet (50) attached to the float (57) and magnetoelectric elements (13) for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member (column 3, line 62 - column 4, line 7).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the magnetic float type liquid level sensor as disclosed by Dumery as the ink level sensor of Duffield et al. in view of Sato.

The motivation for doing so would have been to achieve ink level detection with a high resolution, low cost liquid level detector as taught by column 1, lines 47-51 of Dumery.

Additional Prior Art

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Thompson et al. US 3,967,549 discloses an ink level detector and ink supply valve control mechanism wherein when the ink level detector detects an ink overflow level the ink supply valve is closed (column 7, lines 55-60).

Jinnai et al. US 4,178,595 discloses an on-carriage ink tank with an ink level detector and supplying ink from an off carriage tank with the ink level detector detects a low ink level (abstract).

Ichihashi et al. US 4,737,801 discloses various valve arrangements for supplying ink to an inkjet printhead and provides an ink overflow sensor to detect ink overflow.

Cook US 6,155,664 discloses an on-carriage ink tank (4) with an ink level detector (30) and an ink consumption counter (36) (column 13, lines 5-19) and utilizing the count to determine ink refill servicing (figure 4), utilizing the ink level detector to verify ink refill servicing (figure 5) or utilizing both the count and ink level sensor and verifying the operability of the count and ink level measurement in obtaining the proper ink level during the ink refill servicing (figure 6).

Lewis et al. US 6,290,343 discloses monitoring ink pressurization in an ink feeding mechanism utilizing an air compressor (702) and a pressure relief valve (706).

Tamura et al. EP 1 097 814 discloses an ink level detector utilizing a magnet attached to a float and a series of magnetoelectric elements (hall sensors) used to detect the ink level.

Allowable Subject Matter

8. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the indication of the allowability of claim 5 is the inclusion therein, in combination as currently claimed, of the limitation of the ink level detector being capable of detecting an ink overflow state of the sub-tank, wherein when the overflow state is detected, an operation is performed for opening an ink supply valve and for releasing to the atmosphere the air compressed by the air compressor applied to the space defined between the flexible ink pack of the ink cartridge and the outer block member. This limitation is found in claims 5 and is neither disclosed nor taught by the prior art of record, alone or in combination.

The examiner recognizes that the allowable subject matter provides advantages to the art including, but not limited by, ease of prevention of inappropriate ink overfilling of the sub-tank mounted on the carriage from the ink cartridge.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Contact Information

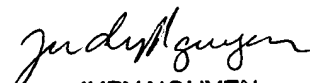
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet whose telephone number is (703) 305-3007. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow, Jr. Art Unit 2853, can be reached on (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet November 7, 2002

BM 11/7/2002


JUDY NGUYEN
PRIMARY EXAMINER